Claims

1. Method for identifying and authenticating different objects or substances, this method using a computer system coupled to spectrophotometry means,

characterized in that it comprises at least the two following successive phases :

- an initial phase comprising:
  - choosing a plurality of chemical markers which, when excited by an incident light ray, emit energy radiations whose frequency spectra can be distinguished from one another and with respect to objects and substances in which they are intended to be incorporated,
  - allocating then incorporating in each of the objects or substances a combination of markers that is different to the combinations allocated to the other markers,
  - determining an authentication code for said object or said substance defined using parameters comprising at least the presence or absence of markers in the allocated combination,
  - storing in the memory of a computer system the authentication code of all the objects or substances and of related data corresponding to these objects or these substances,
  - allocating an identification code to the object or substance, such as a bar code or similar, this identification code possibly being associated with the object, with the substance, with its recipient, and/or its packaging,
  - storing, in the memory of said system, the identification codes for each of the objects,
  - defining a correspondence between the identification codes and the authentication codes.
- an identification and authentication phase by said system, this phase comprising:

- theoretical identification of the object or substance by reading the identification code associated with the object,
- spectrophotometric analysis of at least part of the object or substance so as to detect said above parameters, in particular the presence or absence of markers, and determination of the authentication code of the object or substance,
- authentication of the object if the theoretical identification code corresponds to the authentication code,
- emission of a validation signal if a correspondence is detected or of an alert signal if the authentication code does not correspond to the identification code.

2. Method as in claim 1,

characterized in that said spectrophotometric analysis comprises the following steps:

- irradiating the marked object or substance with a light ray emitted by a generator (block 3),
- sending the transmitted or reflected waves onto a dispersing element (1) which deflects them so as to obtain a light spectrum of the light intensity in different zones of the spectrum corresponding to different wavelength ranges,
- detecting the light intensity in said zone,
- comparing this intensity with one or more threshold values specifically allocated to this zone and which are recorded in memory as being said above parameters,
- the result of this comparison contributing towards determination of the authentication code of the object.

3. Method as in claim 2,

characterized in that it comprises the determination of said above zones of the spectrum to be analysed, and of the different parameters allocated to each of these zones, using said above identification codes.

4. Method as in claim 2,
characterized in that it comprises servo-controlling the light intensity emitted by the light radiation generator in relation to the difference between the value of the detected light intensity, over a predetermined frequency range not affected by the presence of the markers, and a predetermined set value.

5. Method as in any of the preceding claims,
characterized in that it comprises the incorporation into the object and/or substance of one or more calibration markers by means of which the computer system conducts corrections and/or calibration so as to overcome noises possibly deriving from the composition of the substance or object, from variations in positioning such as the angle of incidence of the radiation emitted by the light ray generator, and distance to the object.

6. Method as in any of claims 2 to 5,
characterized in that said above generator of light radiation comprises a light source with wide frequency spectrum such as an arc lamp or a light bulb generating a white light.

7. Method as in any of claims 2 to 5,
characterized in that said generator of light radiation comprises a plurality of laser radiation sources specifically chosen in relation to the type of chemical markers used, and a mixer to mix the different radiations emitted by these sources.

8. Method as in claim 2,

characterized in that said processing of data from spectrophotometric analysis comprises the following steps:

- sampling of the spectrum,
- conversion of the analogue signal into a digital signal having a predetermined frame (block 4),
- fenestration in relation to the wavelength ranges indicated in the authentication data stored in memory, and extracted by identifying the bar code, so as to determine a readout code with said above parameters (block 5),
- comparison of authentication data with the experimental data or readout code (block 6),
- displaying of the result (13) visually and/or audibly so as to indicate:
    - o successful authentication if the authentication codes and the readout code coincide (bloc 7),
    - o an alert in the event of non-authentication if the authentication codes and the readout code do not tally (block 8).

9. Method as in claim 1,

characterized in that said marking is made via a medium containing the marker or markers, this medium possibly being a label (15) or an insert.

10. Method as in claim 9,

characterized in that said medium containing the marker or markers is reflective.

11. Method as in either of claims 9 and 10,

characterized in that a blank medium free of any marker is added and also irradiated then, during data processing, the spectrum data of the blank medium are subtracted from the spectrum data of the marked medium so as to eliminate corresponding signals and to simplify analysis.

12. Method as in any of the preceding claims,
characterized in that, during data processing, the spectrum data of the object or substance free of markers are subtracted from the spectrum data of the marked object or substance.

13. Method as in any of the preceding claims,
characterized in that said combination of markers comprises at least one fluorescent marker.

14. Method as in claim 11,
characterized in that said parameters also comprise the duration of the light emission of the substance to be identified subsequent to excitation.

15. Method as in claim 14,
characterized in that said parameters comprise:

- the presence or absence of fluorescence,
- a fluorescence time greater or less than a threshold value,
- the presence or absence of a peak at a preset wavelength and/or,
- emission peak heights corresponding to a concentration of markers that is greater or less than a predefined threshold value.